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SGMM

Smart Grid Maturity Model

Empower your Smart Grid Transformation

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10 March 2011

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
10 MAR 2011		**00-00-2011 to 00-00-2011**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Empower your Smart Grid Transformation	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Carnegie Mellon University ,Software Engineering Institute,Pittsburgh,PA,15213**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

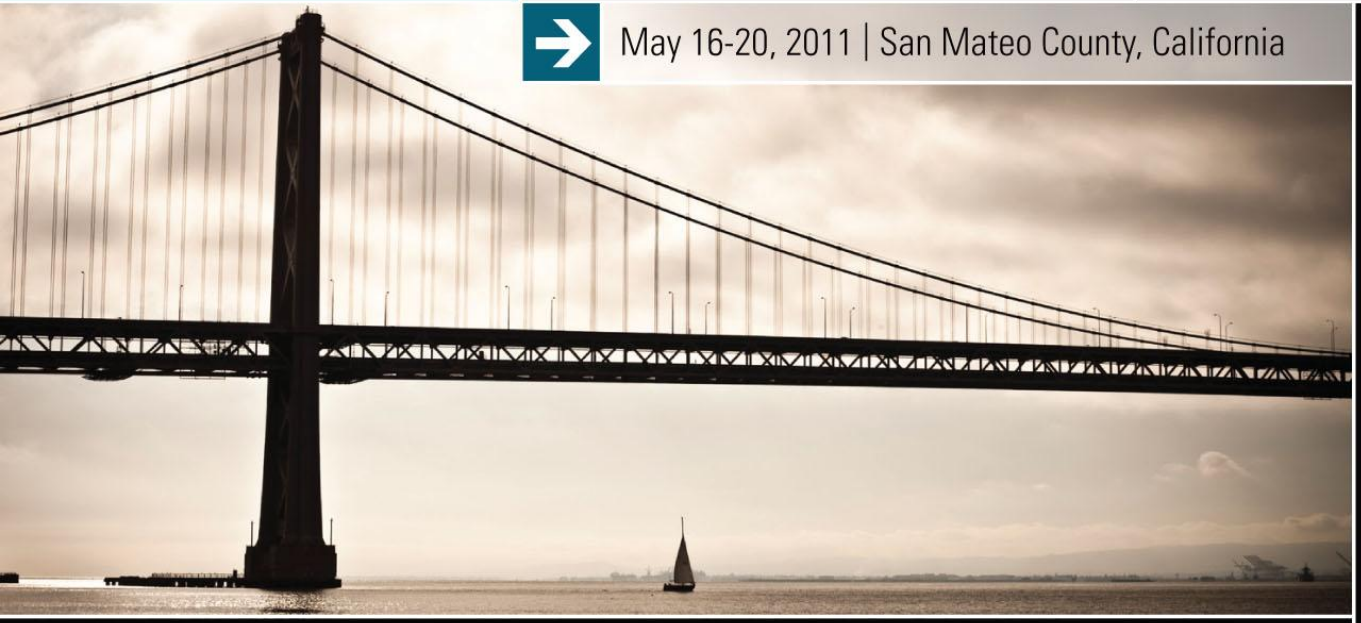
15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**38**	

SATURN 2011

Seventh Annual SEI Architecture Technology User Network Conference

Architecting the Future



May 16-20, 2011 | San Mateo County, California

The SEI Architecture Technology User Network (SATURN) Conference brings together experts to exchange best architecture-centric practices in developing, acquiring, and maintaining software-reliant systems.

7 Things You Need to Know About the Next 7 Years in Architecture.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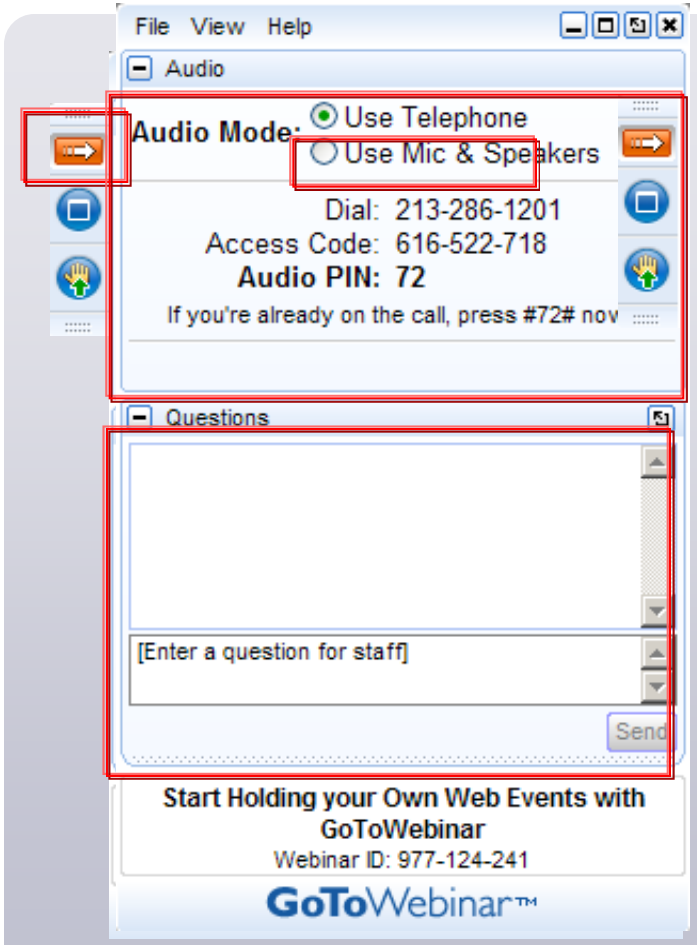
SEI Launches New Technology Blog

With posts written by staff members, the blog will provide the SEI audience with insights into the broad spectrum of work at the SEI via a two-way, read-write medium.

http://blog.sei.cmu.edu/

How to Participate Today



Open and close your Panel

View, Select, and Test your audio

Submit text questions

Q&A addressed at the end of today's session

About the Speaker

David White is a member of the Resilient Enterprise Management (REM) team in the CERT Program at the Carnegie Mellon's Software Engineering Institute (SEI). The REM team performs research and development in the areas of operational resilience, critical infrastructure protection, and smart grid deployment.

David is the project manager and a core development team member for the SEI Smart Grid Maturity Model (SGMM), a business tool to assist utilities with planning and tracking progress of their grid modernization efforts.

David is also a core development team member for the CERT® Resilience Management Model (CERT-RMM), a process improvement model for managing security, business continuity, and IT operations.

David works from his home in New York City.

Polling Question #1

How did you hear about today's webinar?

a) DistribuTECH 2011 (conference or email)

b) Social Media (Twitter, LinkedIn)

c) Email Invitation from the SEI

d) SEI Website or Press Release

e) Online Webinar Calendar (i.e. webinarlistings.com/)

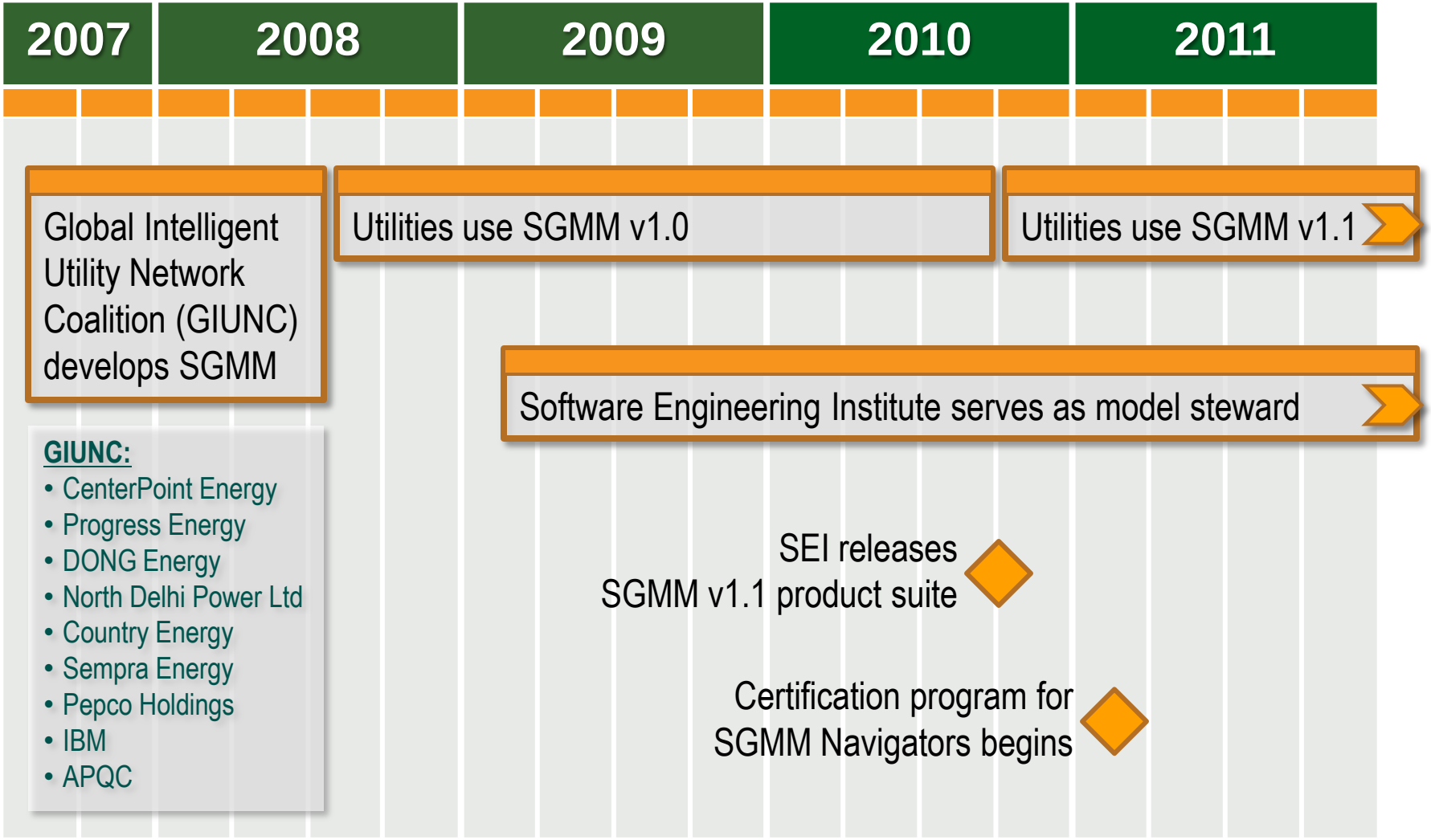
A major power grid transformation is underway.

How can utilities

- Develop effective roadmaps?
- Track progress?
- Understand their posture in comparison to peers?

SGMM was developed to address these concerns

SGMM History



Developed by utilities for utilities

Polling Question #2

How did you learn about SGMM?

a) From using the model

b) Website

c) Conference or event

d) This webinar announcement

e) Other

What Is the Smart Grid Maturity Model?

SGMM is a

MANAGEMENT TOOL

that provides a

COMMON FRAMEWORK

for defining key elements of

SMART GRID TRANSFORMATION

and helps utilities develop a

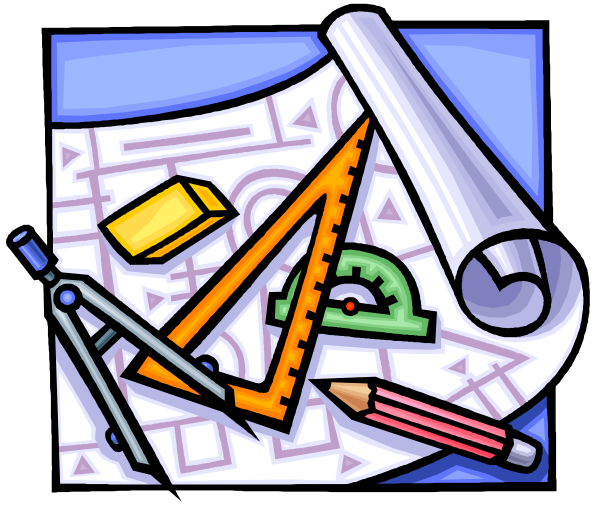
PROGRAMMATIC APPROACH

and track their progress.

How Is the SGMM Used?

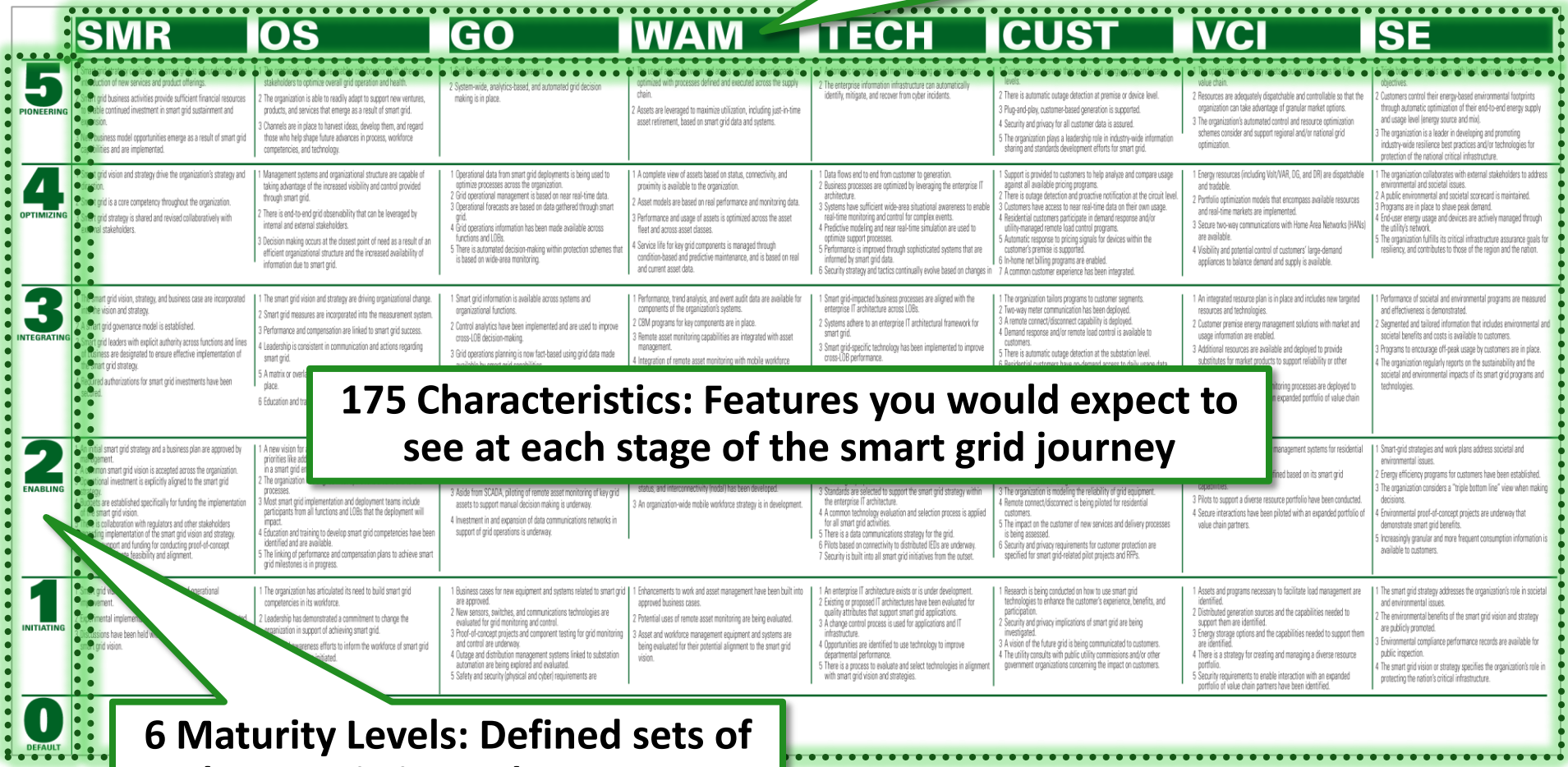
SGMM is used to help organizations

- Identify where they are on the smart grid landscape
- Develop a shared smart grid vision and roadmap
- Communicate using a common language
- Prioritize options and support decision making
- Compare to themselves and the community
- Measure their progress
- Prepare for and facilitate change



SGMM at a Glance

8 Domains: Logical groupings of smart grid related capabilities and characteristics



175 Characteristics: Features you would expect to see at each stage of the smart grid journey

6 Maturity Levels: Defined sets of characteristics and outcomes

The Smart Grid Maturity Model – Levels

PIONEERING **5**	Breaking new ground; industry-leading innovation
OPTIMIZING **4**	Optimizing smart grid to benefit entire organization; may reach beyond organization; increased automation
INTEGRATING **3**	Integrating smart grid deployments across the organization, realizing measurably improved performance
ENABLING **2**	Investing based on clear strategy, implementing first projects to enable smart grid (may be compartmentalized)
INITIATING **1**	Taking the first steps, exploring options, conducting experiments, developing smart grid vision
DEFAULT **0**	Default level (status quo)

Eight SGMM Domains

SMR	**Strategy, Mgmt & Regulatory** *Vision, planning, governance, stakeholder collaboration*	TECH	**Technology** *IT architecture, standards, infrastructure, integration, tools*
OS	**Organization and Structure** *Culture, structure, training, communications, knowledge mgmt*	CUST	**Customer** *Pricing, customer participation & experience, advanced services*
GO	**Grid Operations** *Reliability, efficiency, security, safety, observability, control*	VCI	**Value Chain Integration** *Demand & supply management, leveraging market opportunities*
WAM	**Work & Asset Management** *Asset monitoring, tracking & maintenance, mobile workforce*	SE	**Societal & Environmental** *Responsibility, sustainability, critical infrastructure, efficiency*

SGMM

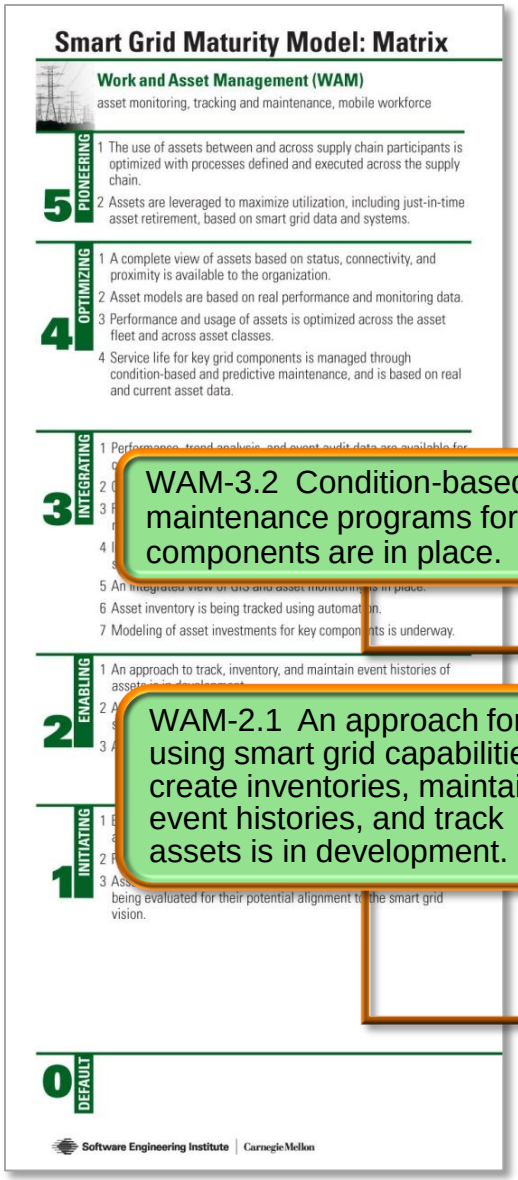
Smart Grid Maturity Model

V 1.1 Product Suite

www.sei.cmu.edu/smartgrid

Model	• Model Definition document • Matrix
Compass Survey	• Compass survey yields maturity ratings and performance comparisons
Navigation Process	• Facilitated completion and interpretation of Compass, led by a certified "SGMM Navigator"
Training	• Overview Seminar • SGMM Navigator Course
Licensing	• License organizations and certify individuals to deliver Navigation process

Compass Survey



Contains

- One question for each expected characteristic in the model and
- Demographic and performance questions

Example questions

WAM-3.2 Condition-based maintenance programs for key components are in place.

WAM-3.2 For what percentage of key components have you implemented condition-based maintenance?

- ☐ A. 0%
- ☐ B. 1 - 25%
- ☐ C. 26 - 50%
- ☐ D. 51 - 75%
- ☐ E. 76 - 100%

WAM-2.1 An approach for using smart grid capabilities to create inventories, maintain event histories, and track assets is in development.

WAM-2.1 Have you established an approach to track, inventory, and maintain event histories of assets using smart grid capabilities?

- ☐ A. No
- ☐ B. In documented plan including committed schedule and budget
- ☐ C. In development
- ☐ D. Being piloted
- ☐ E. Completed

Two ways to Complete SGMM Compass

1. SGMM Navigation

SGMM Navigator

- Leads utility stakeholders through defined process including two consensus-building workshops
- Helps utility stakeholders interpret and answer survey questions
- Analyzes and presents findings to help utility stakeholders reach consensus on SGMM aspirations
- Documents results and provides follow-on support

Expert-led

2. Self Assessment

Utility

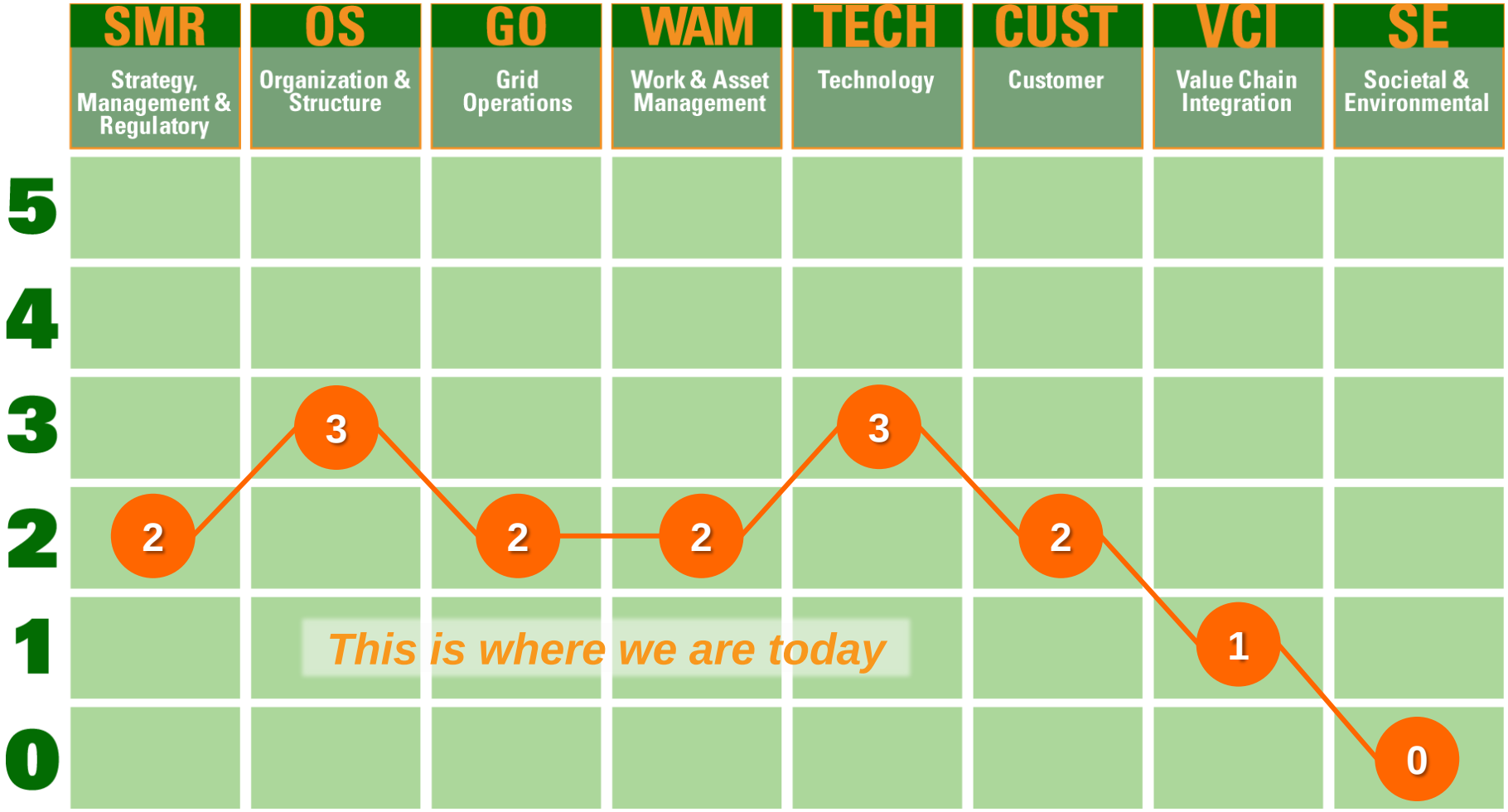
- Completes survey
- Submits survey for scoring
- Receives scoring report containing
  - Maturity rating by domain
  - Community statistics for comparison

Self-service

Example results
Fictitious organization

Compass Results: Maturity Profile

Both Navigation and self-assessment yield current rating by domain



Example results
Fictitious organization

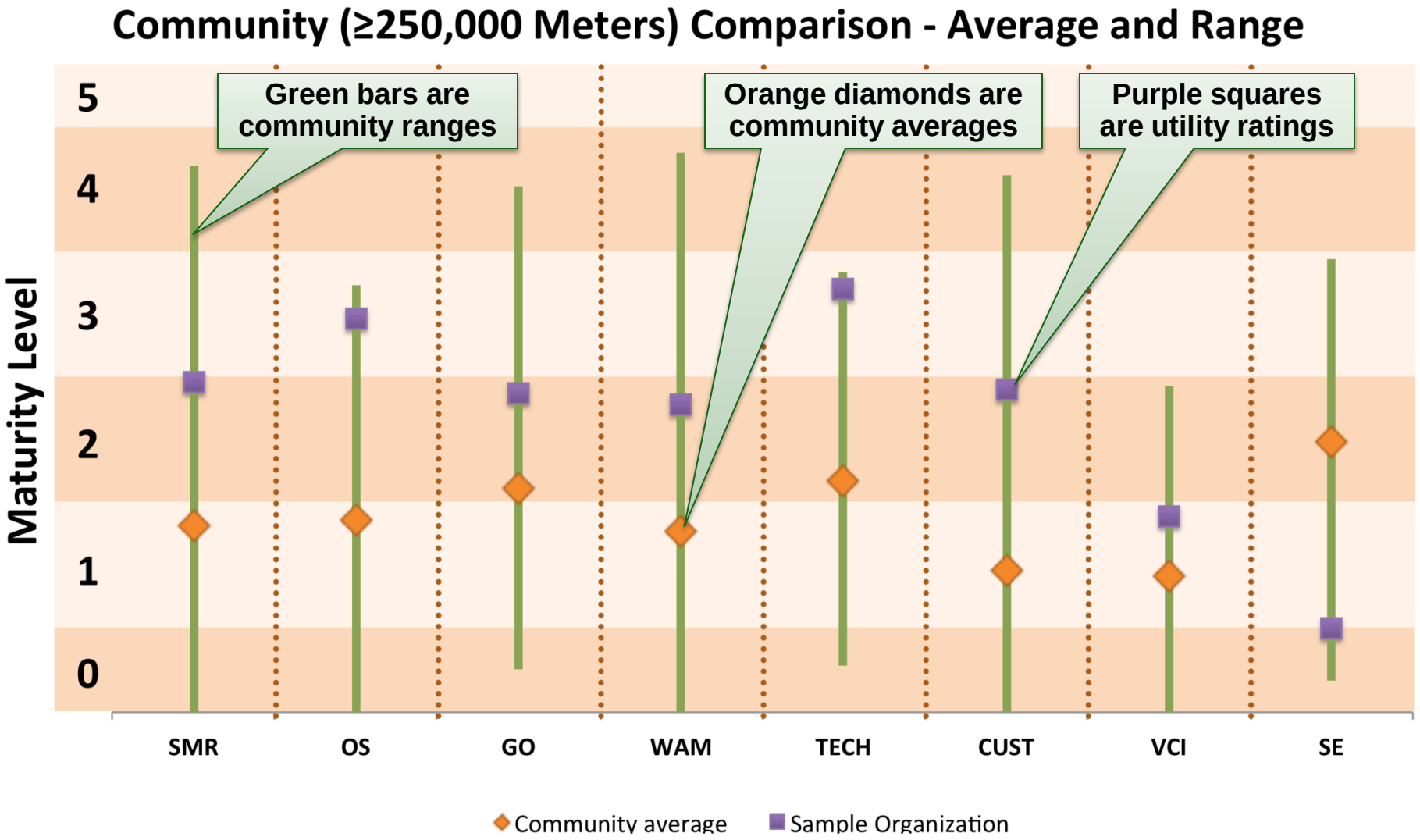
Compass Results: Detailed Scores

Sample Results								
Level	Strategy, Management & Regulatory	Organization & Structure	Grid Operations	Work & Asset Management	Technology	Customer	Value Chain Integration	Societal & Environmental
5	0.53	0.50	0.25	0.00	0.00	0.20	0.30	0.30
4	0.57	0.17	0.28	0.30	0.40	0.36	0.25	0.40
3	0.65	0.75	0.57	0.47	0.73	0.59	0.58	0.35
2	1.00	0.82	0.93	1.00	1.00	0.92	0.58	0.76
1	0.90	1.00	1.00	1.00	0.84	0.85	0.78	0.68
0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

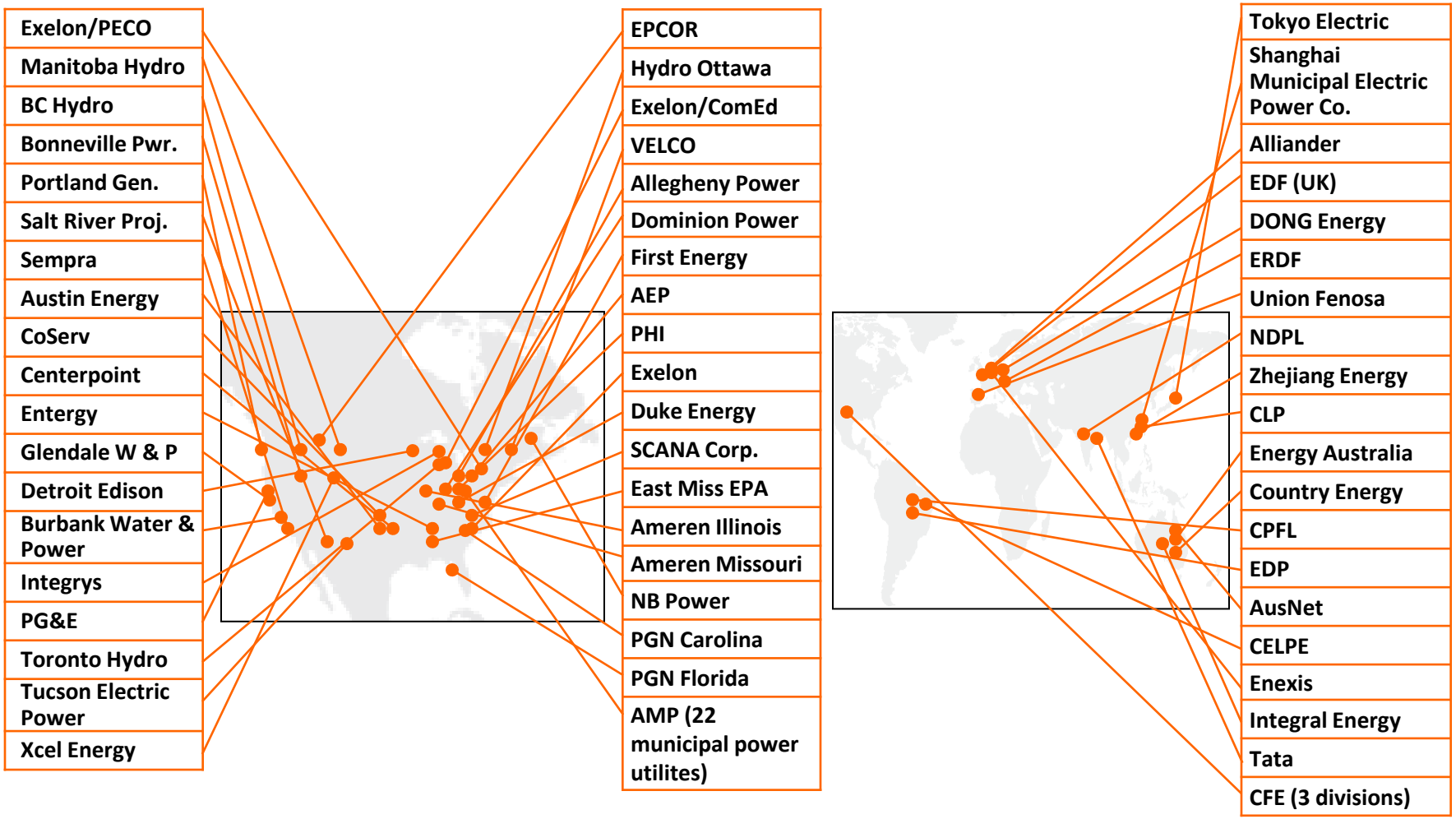
	Point Range	Meaning
	≥ 0.70	Green reflects level compliance within the domain
	≥ 0.40 and < 0.70	Yellow reflects significant progress
	< 0.40	Red reflects initial progress
	= 0	Grey reflects has not started

Example results
Fictitious organization

Compass Results: Community Data



SGMM User Community as of October 2010



Polling Question #3

How important is grid modernization in your region?

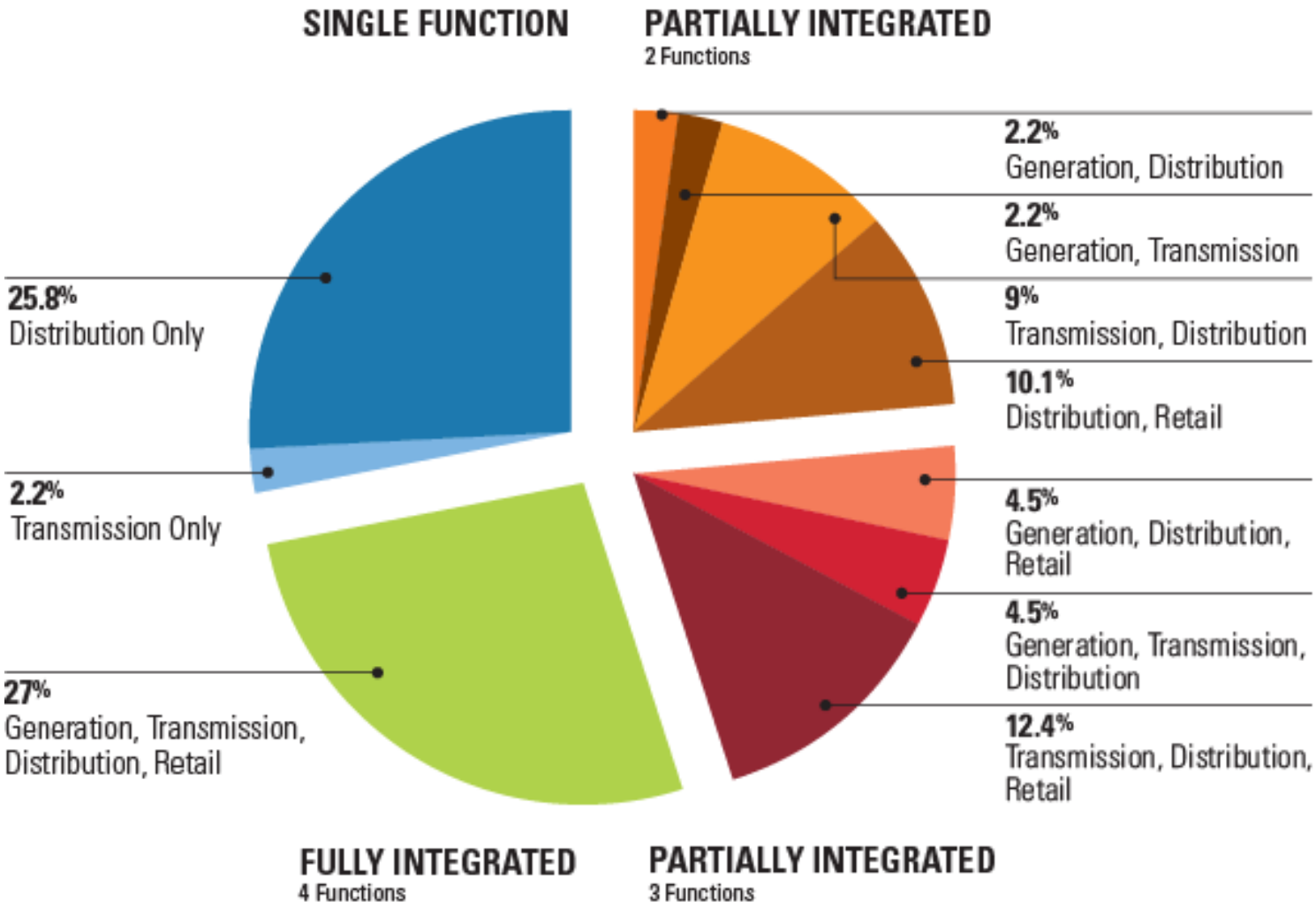
a) Extremely

b) Somewhat

c) Not very

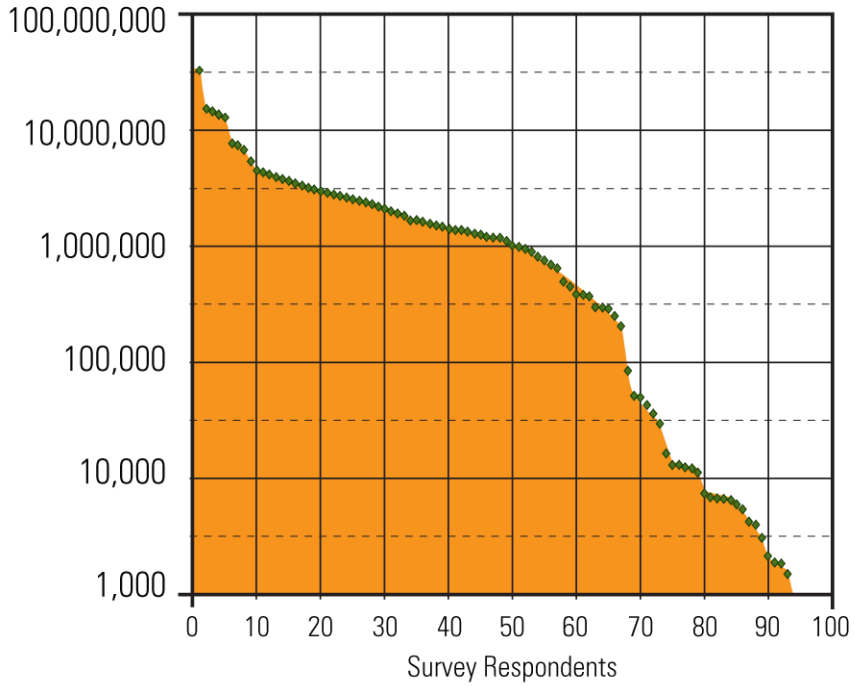
d) Not at all

SGMM Community Data – Utility Type

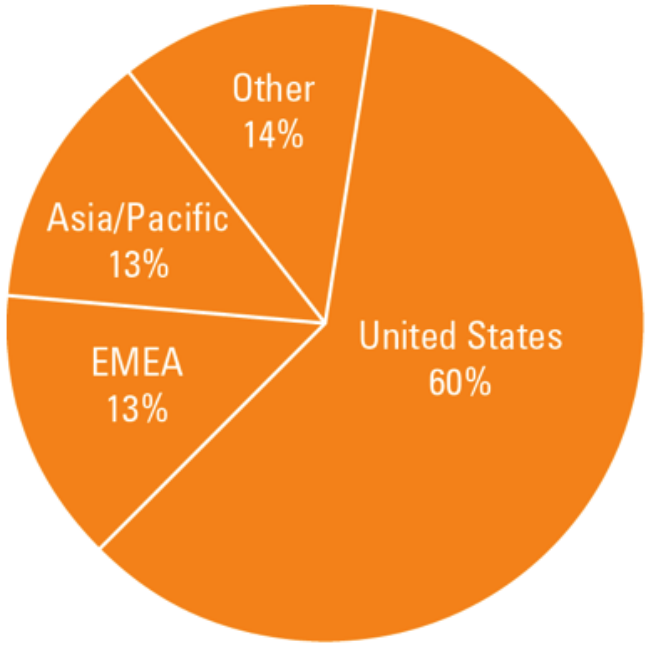


SGMM Community Data – Size and Location

Meter Count



Distribution by region



Polling Question #4

Where are you located?

a) North America

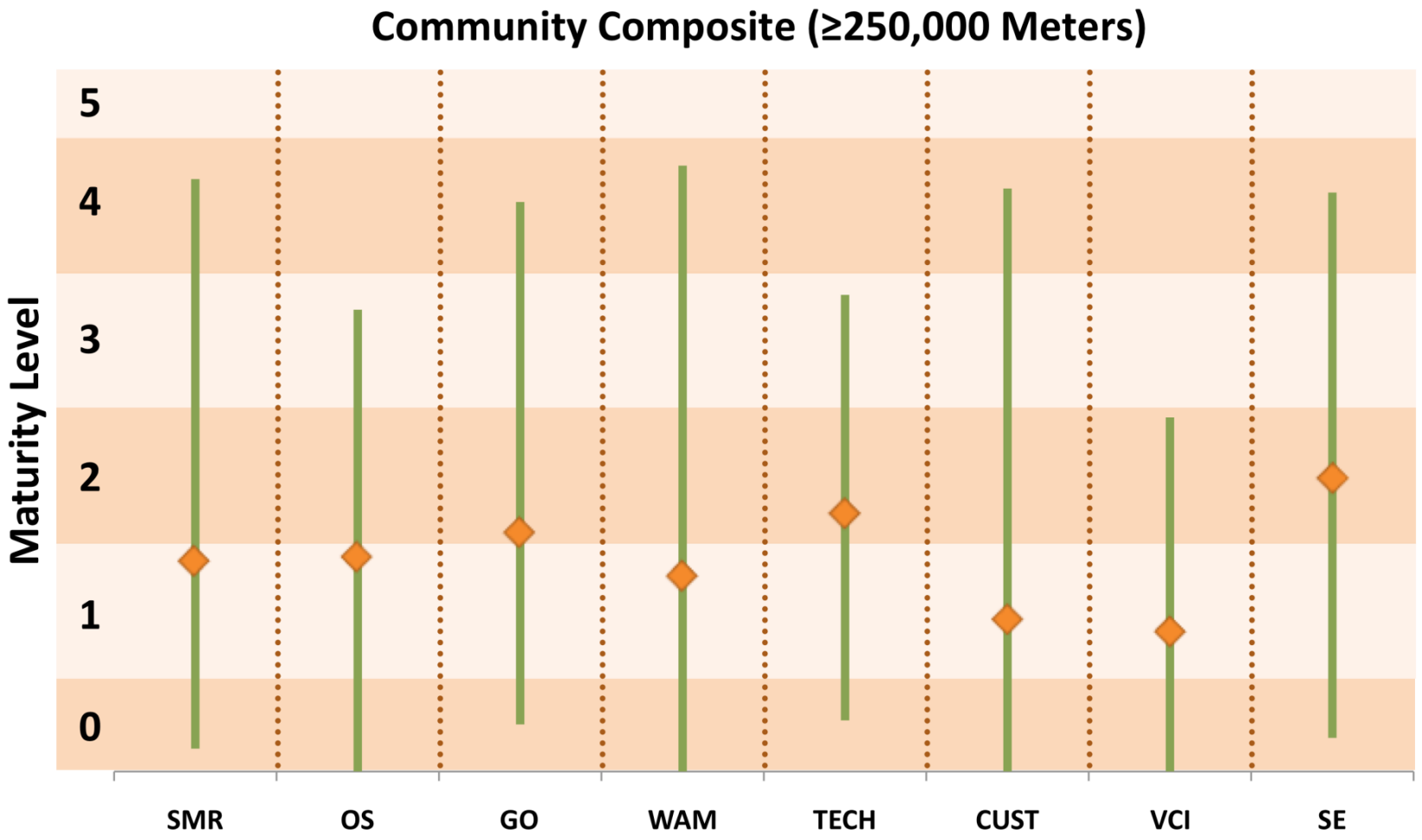
b) South or Central America

c) Europe

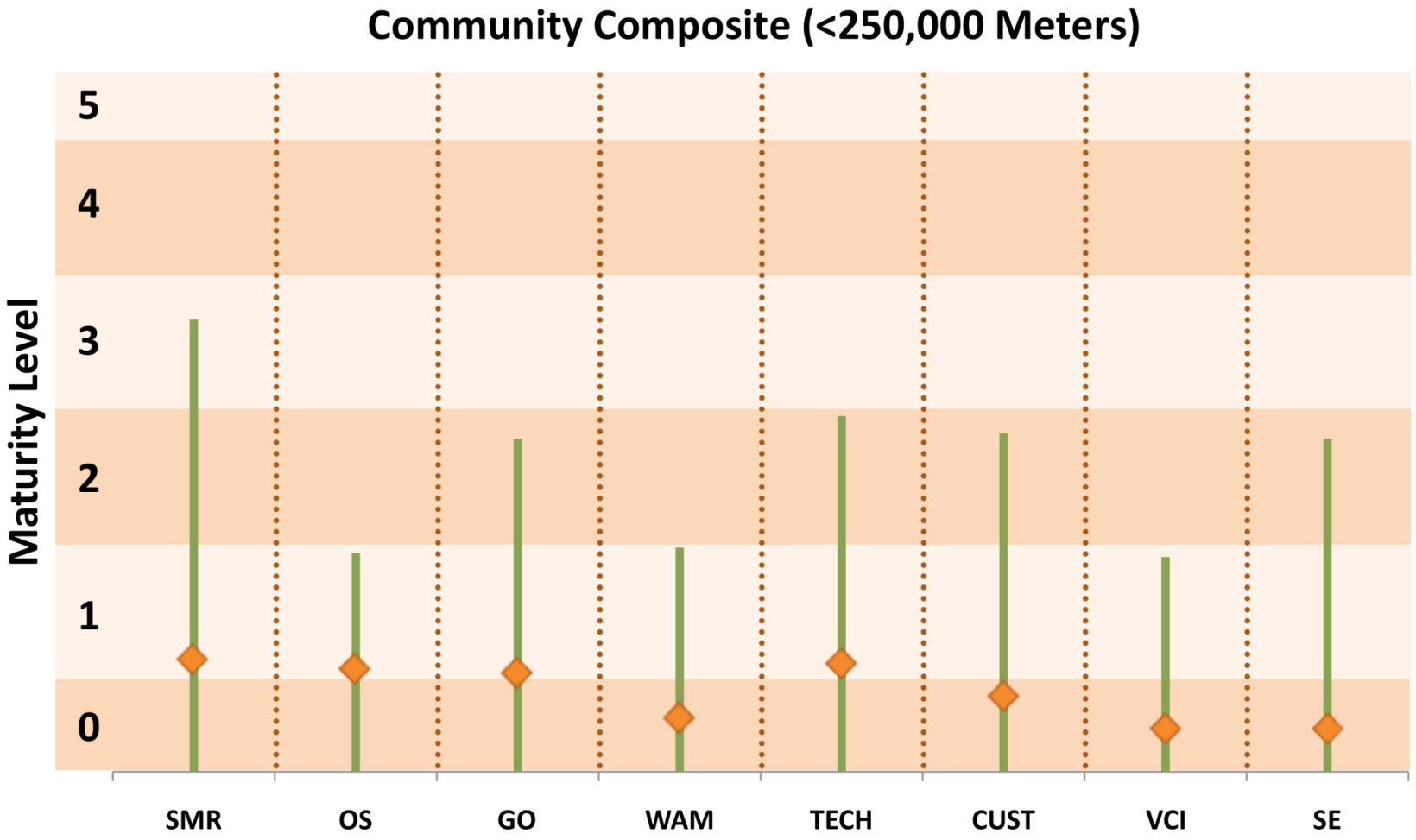
d) Middle East/Africa

e) Asia/Pacific

SGMM Community Data – Average and Range



SGMM Community Data – Average and Range



Navigation Process

A five-step process lead by a certified SGMM Navigator

1. Preparations are completed, first four Compass survey sections are completed
2. Survey Workshop: stakeholders from utility complete the Compass survey as a team, discussions occur to develop consensus on responses
3. Navigator analyzes results and prepares findings
4. Aspirations Workshop: Compass results and findings are presented and discussed; aspirations for planning horizon are agreed through consensus discussions
5. Actions are planned and documentation is completed to conclude the process

Community Comparison

Legend: Top 10-30% | Bottom 30% | Top 10%

Example results
Fictitious organization

Strategy, Mgmt, & Regulatory

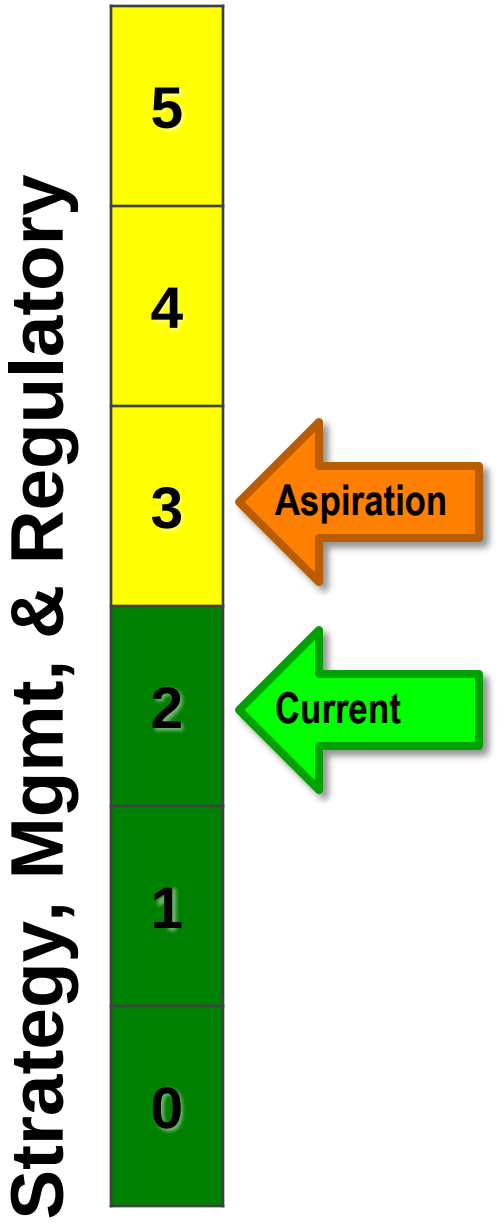
5	5.3 New business model opportunities emerge as a result of smart grid capabilities and are i
	5.2 Smart grid business activities provide sufficient financial resources to enable continued i sustainment and expansion.
	5.1 Smart grid strategy capitalizes on smart grid as a foundation for the introduction of new services and product offerings.
4	4.3 Smart grid strategy is shared and revised collaboratively with external stakeholders.
	4.2 Smart grid is a core competency throughout the organization.
	4.1 Smart grid vision and strategy drive the organization's strategy and direction.
3	3.4 Required authorizations for smart grid investments have been secured.
	3.3 Smart grid leaders v implementa ffective
	3.2 A smart grid go
	3.1 The smart grid visio
2	2.6 There is support an
	2.5 There is collaboratio and strategy. sion
	2.4 Budgets are establi
	2.3 Operational investm
	2.2 A common smart grid vision is accepted across the organization.
	2.1 An initial smart grid strategy and a business plan are approved by management.
1	1.3 Discussions have been held with regulators about the organization's smart grid vision.
	1.2 Experimental implementations of smart grid concepts are supported.
	1.1 Smart grid vision is developed with a goal of operational improvement.

Aspiration setting:

1. Model characteristics are sequentially reviewed, discussed, and considered for levels that have not yet been achieved
2. Consensus on relevance and importance to organization for achieving characteristics is used to set aspiration

Aspiration Setting Tool

Example results
Fictitious organization



What motivates this aspiration?

-
-
-
-

What actions must happen to achieve this aspiration?

-
-
-
-

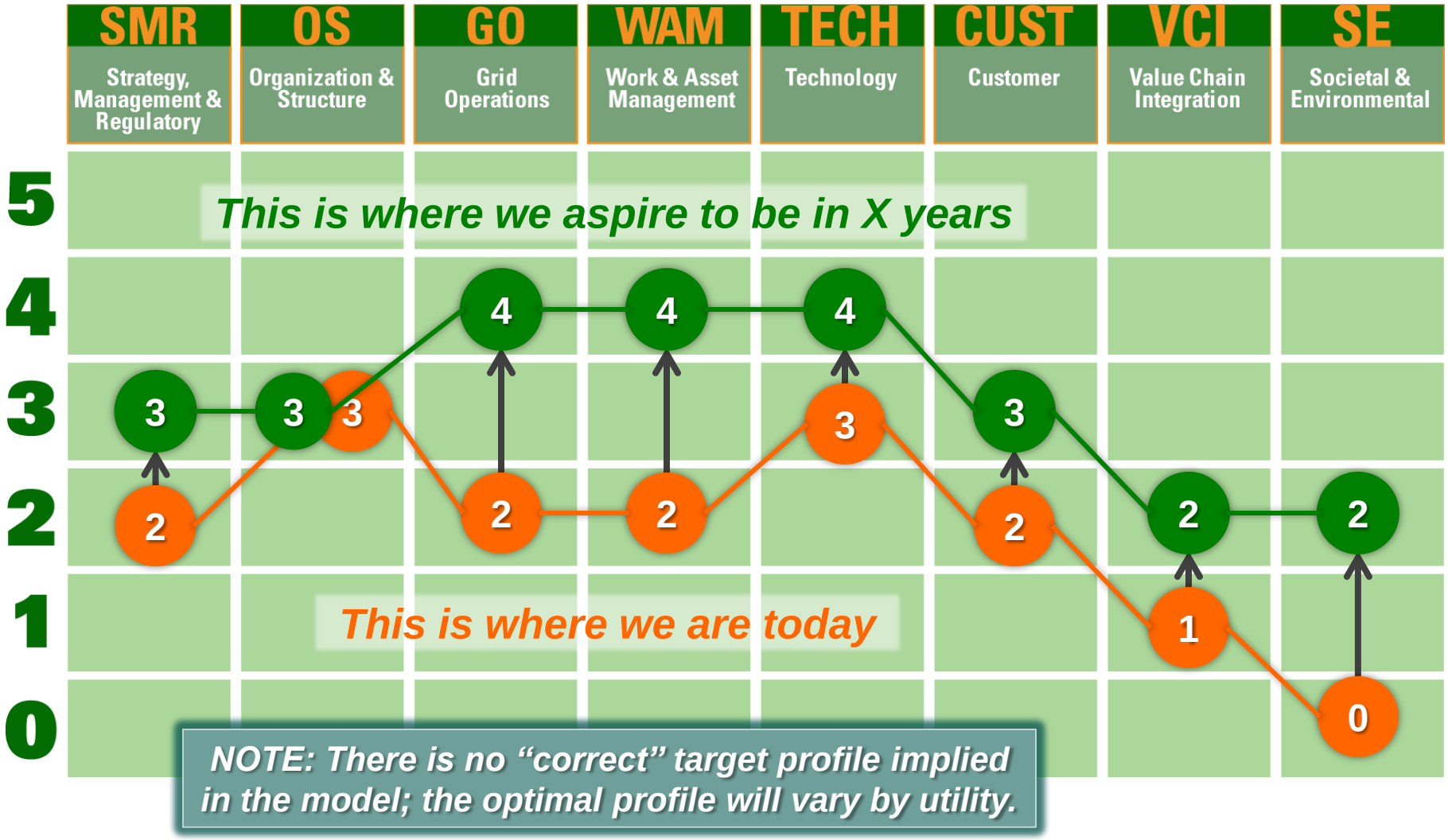
What are the obstacles that must be overcome to achieve this aspiration?

-
-
-
-

Example results
Fictitious organization

Setting Aspirations

Workshop 2 sets *strategic aspirations* by domain, for example:



Licensing and Certification

Licensed organizations are able to

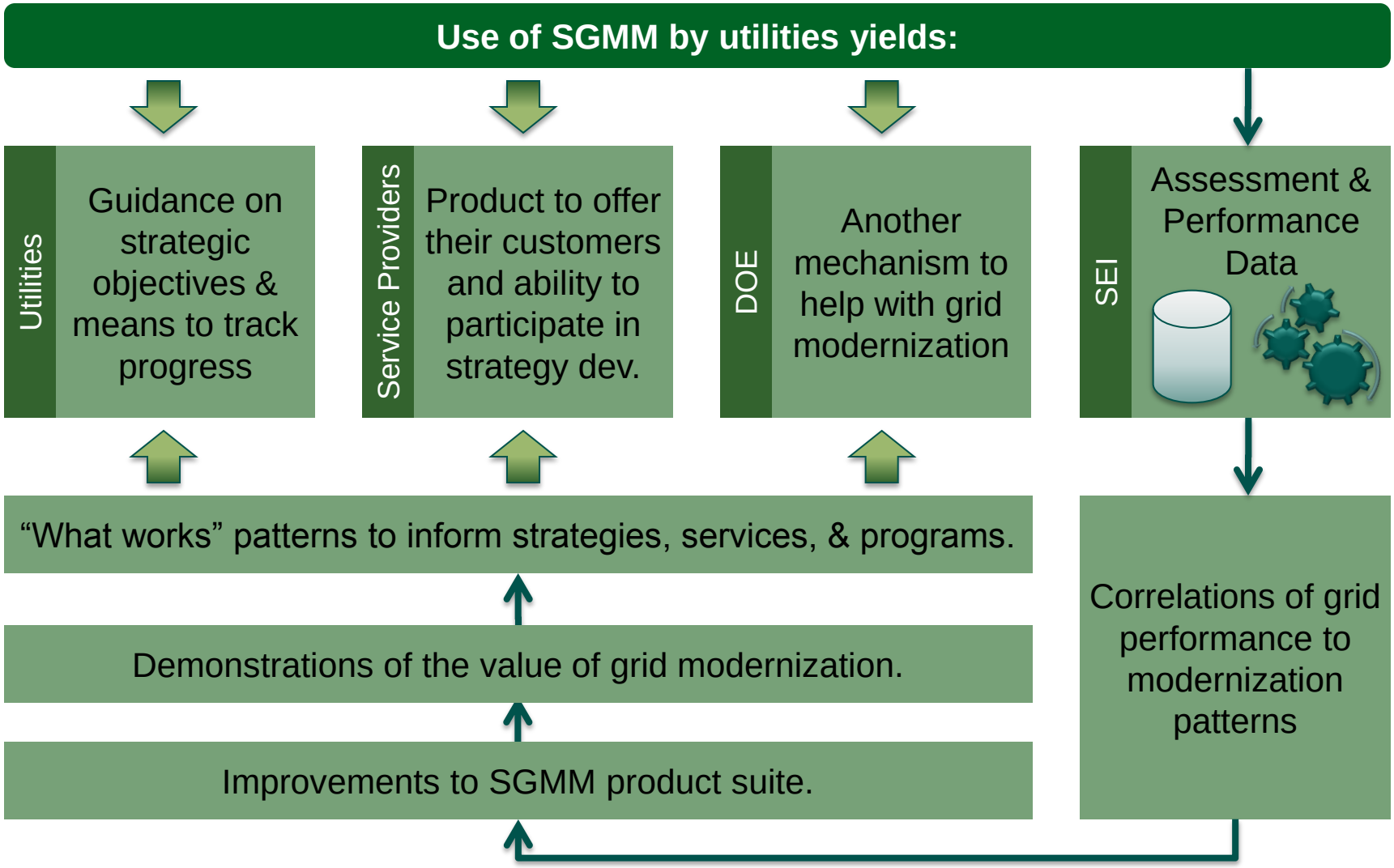
- Offer SGMM Navigation as a service, which must be delivered by Certified SGMM Navigators
- Sponsor individuals to become Certified SGMM Navigators
- Participate in the ongoing evolution of the model

Certified SGMM Navigators are

- Trained and certified by SEI: 3-day course, exam, and reviewed first delivery
- Recognized as SGMM and industry experts
- Equipped with turn-key materials to lead SGMM Navigation process including detailed process scripts, checklists, and templates
- Provided with regular updates from and special access to model team

SGMM licensing and certification program is currently in pilot phase

SGMM Benefits – A Community View



Polling Question #5

I work for:

a) An electric utility

b) A service provider or vendor to electric utilities

c) A government organization

d) Other

Next Steps to Consider

Complete the post webinar survey

This will automatically present when you exit the webinar.

Learn more about the model

Follow links on the post webinar resource web page.

Find a licensed organization to lead a SGMM Navigation

www.sei.cmu.edu/partners/directory/organization/

Select “Smart Grid Maturity Model” in the “Service” pull-down.

Complete a self-assessment

Email info@sei.cmu.edu and request instructions for SGMM self-assessment.

Learn more about the SGMM Navigator certification process

Complete the inquiry form on the post webinar resource web page.

Learn about the SGMM licensing program

Email info@sei.cmu.edu and request information about the SGMM licensing program.

For all other inquiries, please email info@sei.cmu.edu

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The Software Engineering Institute

SEI is a federally funded research and development center based at Carnegie Mellon University, a global research university recognized worldwide for its energy and environmental research initiatives.

A trusted, objective source of best practices, methods and tools to organizations worldwide, SEI is a global leader in software and systems engineering, process improvement and security best practices – all critical elements of smart grid success.

SEI collaborates in public-private partnership with government and industry on important cyber security, architecture and interoperability challenges of the smart grid.

SEI's Role as Steward of the SGMM

Provide **governance** working with multiple stakeholders

Enable **widespread availability**, adoption, and use of the model for the benefit of the community

Evolve the model based on stakeholder needs, market developments, user feedback, and interactions with domain experts

Develop **transition** mechanisms—education, training, awareness, research collaboration—to support the model

Grow the SGMM **community** of users worldwide